

"A Success Story"

Montgomery County Public Schools

Speaker: Barry J. Hemler

3rd Annual *IAQ TfS* National Symposium

August 8, 2002



IAQ Comes to the Forefront!

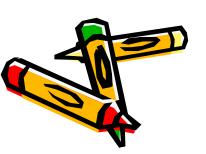
- Odors of poured gym floor causes community concern of "toxic exposure"
 - I socyanates as catalyst
 - Poor ventilation
 - Improper procedures

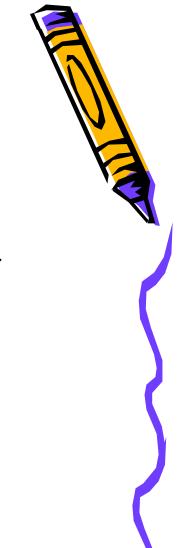




IAQ Comes to the Forefront!

- Visible mold growth and poor ventilation prompt assessment of entire school
 - Mold on furniture
 - Rusty ventilation equipment
 - Limited outside air
 - Moisture control/intrusion





School system responses questioned!

- Timeliness of response
- Qualifications of responders
- Dismissing community concerns
- Evaluation criteria of indoor environment



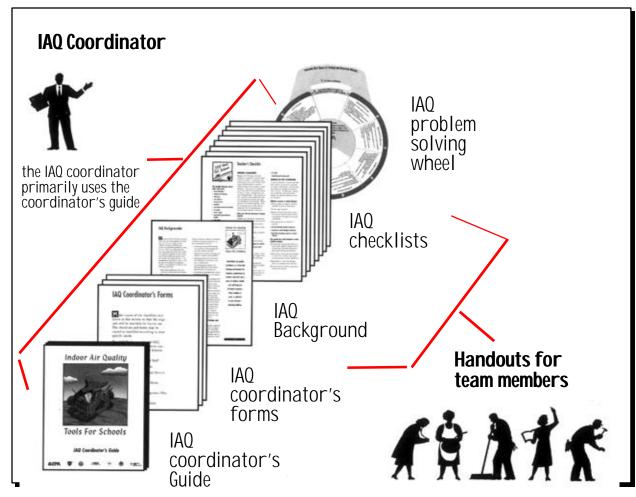


That was then...

- Lack of formal IAQ program
- 'Us' vs. 'Them' mentality
 - 'Adversarial' relationship with teacher's union
- Associate Superintendent convened I AQ Process Action Team, August '97
 - Various MCPS representatives
 - Customers
 - Stakeholders



Process Action Team presents Tools for Schools as Program Template





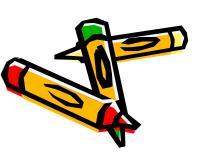
IAQ Process Action Team

- Final report March 4, 1998
- Submitted over thirty recommendations affecting all levels of the organization
- Many recommendations addressed in reorganization of Spring/Summer 2000
- Top-down support for IAQ program
- Health and safety as part of culture



This is now!

- Team member of Department of Facilities Management
 - Division of Construction
 - Division of School Plant Operations
 - Division of Maintenance
 - Real Estate Management Team
 - Energy Management Unit
 - Environmental Safety/IAQ Office





Mission Statement

 The mission of the Environmental Safety/IAQ unit is to foster teamwork among the customers and stakeholders of MCPS to help create and maintain safe and healthy public facilities for learning and employment through dedicated staff who aid in optimizing design, construction, and maintenance processes.

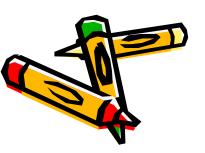
Role of Environmental Safety Coordinators in IAQ

- Empowered to affect change
- Develop and implement IAQ Program
 - Develop and implement strategic plan
 - Set goals and performance measures and determine key results
- Develop budgets and allocate resources
 - Determine operating and capital budgets
 - Set priorities and identify capital projects



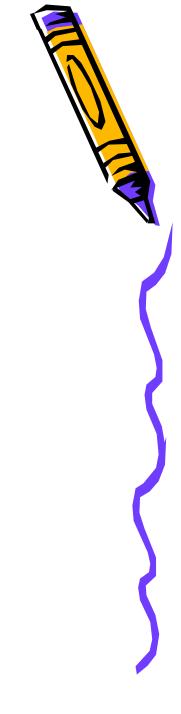
ESC Role continued

- Communicates/coordinates with other divisions/departments
 - How Safety and Health impacts activities
- Communicate with PTA groups
- Point of Contact with State and Local agencies



Key Features of MCPS ES/IAQ Program

- Cultural/BudgetaryCommitment
- Responsive Initiative
- Proactive Initiative
- IAQ Steering Committee
- Special Projects

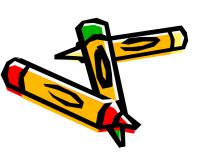


Budgetary Committment

- MCPS educates over 130,000 students in over 200 facilities with an annual budget over \$1 billion
- FY 99 Funds from DFM Operating Budget
- FY 00 Capitol Budget of \$1.2 million
- Capitol and Operating Budget Established
 - FY01 \$ 2.0 million
 - FY02 \$ 2.0 million
 - FY03 \$ 2.3 million

IAQ Responsive Initiative:

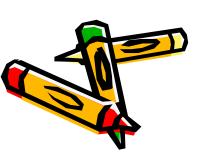
- Formal process for IAQ complaints
 - Describe problem
 - When did symptoms start?
 - When do they get worse?
 - Do they go away?
 - Health conditions?Medications?
 - Building conditions/comments
- Available to all



DepartmentofFacilitiesManagement EnvironmentalSafety/IAQ MONTGOMERYCOUNTYPUBLICSCHOOLS Rockville,Maryland20850	INDOORAIRQUALITYCOMPLAINT	
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Nameofpersonreportingproblem		
Work/School/Facility	Location(specifyroom)	
Nameofprincipalorsupervisor	Dateotthisrequest/_	1
Brieflydescribetheproblem(s)youareexperiencing:		
Whendidyoursymptomsstart?		
Where?		
Whenaretheygenerallyworse?		
Where?		
Dotheygoaway?		
Doyouhaveanyheaithconditionsthatmakeyouparticulariys allergios, asthma)?	susceptibletoenvironmentalproblems(e.g.,contactlenses,	
lfyes, have you sought medical attention and/ortaken medical	ations(daily, weekly, monthly) forthis these conditions?	
Haveyouobservedbuildingconditionsthatmightneedattenti	tionomighthelpexplainyoursymptoms?	
Doycuhaveanyothercomments?		
ACTIONTAKEN		

Building Service Checklist

- In-school check for common I AQ problems
 - General Conditions
 - Air Filters
 - Ventilation Air
 - Fans
 - Belts
 - Leaks

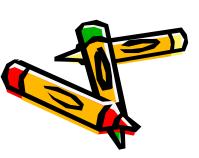


Within the last three months has there been any Construction/Renovation Painting Use of Painting Use of Other Othe	investigator Iold Odors Other On Carpet installation Posticides used pecial deaners or solvents brits and/or stored objects?
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What was the actual room temperature? YesNo is the automatic temperature control system working propor	mately dust/debris free?
Yes No — Is the automatic temperature control system working propor	netakena.m./p.m.
EMany I I May A party research the provided and provided the first of a party	
cooling?	ratureofwatertotheterminalunitsforheating/
FANS	
Yes No — Are all fans in the HVAC system working? Yes No — Are the fan blades clean?	
Yes No — Does affected area have exhaust fans?	
Yes No — Are all the exhaust fans operating including rest room, locks	room, kitchen, and shops?
BELTS	13 W - 14
Yes No — Are any fan belts broken, cracked, or frayed?	
Yes No — Are any belts slipping/squaaling? LEAKS	
Yes No — Are there any steam, water, gas, oil, or refrigorant loaks arout to the conditioned space?	nd or in the heating/cooling unit supplying air
Yes No — Are condensate or drip pans draining properly?	207 10. 12-20. 17/11 2/22-1
Are there any odors coming from, around, or near Gas lines/meters C	Sewerlines Floordrains Grease traps
Yes No — Visiblemold? Where?	
Yes No — If any of the above are check are they near a fresh air intake?	Yes No — Musty/moldyodor

Building Service Checklist

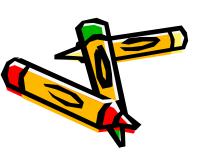
- Electrical
- Recent Work
- Follow up
 - Issues found?
 - Requestor
- Solution or Next Steps





Responsive Initiative:

- When follow up needed to form:
 - Initial Investigation by coordinators
 - Communication with Principal/staff
 - Develop corrective measures
 - Coordination, oversight, and effectiveness of response
 - Communication of effort towards customer satisfaction



Proactive Program:

 To achieve, maintain, and where necessary, to restore an indoor air quality environment in which everyone in a MCPS facility can perform the necessary tasks of learning, teaching, administering, and sustaining facilities in a safe and healthy manner.



IAQ/PM Structure

Environmental Safety Coordinators

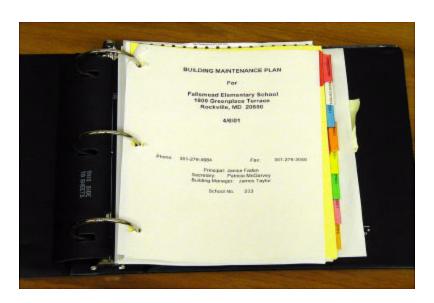
- Two IAQ/PM Teams
 - Environmental Safety Specialist
 - IAQ/PM Supervisor
 - HVAC mechanics
 - IAQ Technicians
 - Electrician



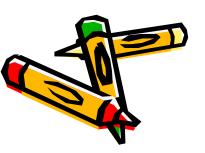


The IAQ/PM Program



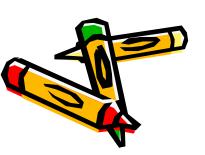


 Meet mission through front-door to backdoor preventative maintenance program focused on improving the indoor learning environment



Schools Selected for IAQ/PM Program

- History of IAQ complaints
- Known deficiencies
- Preliminary remediation/action plans in progress
- MC-Health and Human Services data on childhood asthma rates by zip code





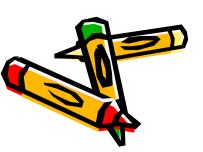
Indoor Air Quality in Schools

A video by MCPS



IAQ/PM Program

- Communication!
- Intro of TfS Action Kit
- Initial Assessment
- Work Plan
- Training
- Building Maintenance Plan
- Annual reassessment/PM activities





Proactive Initiative Costs

- Operating Budget
 - Salaries \$ 300,000 per team
 - Parts/Supplies \$ 70,000 per team
- Cost per building \$ 0.02 0.05/sq. ft.
 - Elementary School 60,000 sq. ft.
 - Middle School 100,000 sq. ft.
 - High School 225,000 sq. ft.
- Generally \$ 1,000 to \$ 9,000 per school
- Average of \$ 3,200 per school
- Big "bang for the buck" program

Program Assessment identified four IAQ/PM Team Performance Measures:

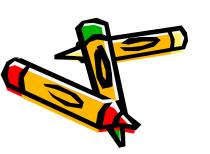
- I AQ Parameters
- Efficiency
- Effectiveness
- Customer Satisfaction





1 - IAQ Parameters

- 7 indoor environmental indices
 - Grab Temp, Long-term Temp, Rh, CO2, CO, Housekeeping, and Air Flow
 - Set criteria AND performance goals for each parameter
- Measured before and after work plan
- Determine measurable change
 - Improved, worse, or same?
 - Did measure meet parameter goal?



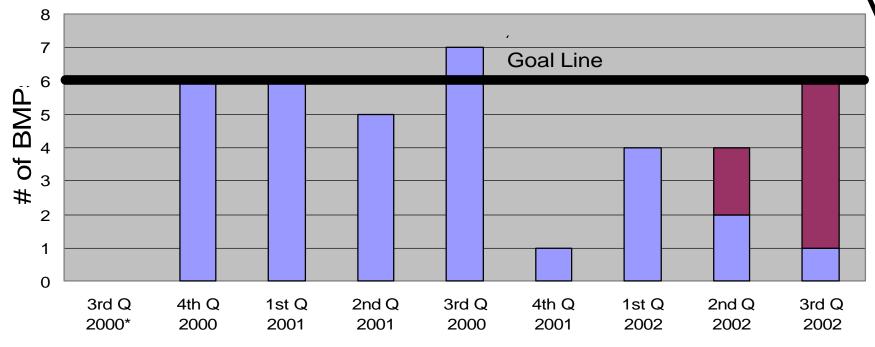
1 - IAQ Parameters

- Overall, 51% of the seven indices is the average for measurable improvement at program schools.
 - Range of 34 75 percent of indices
- With an average of 46% of these meeting their goals
 - Range of 14 88 percent of indices



2 - Efficiency

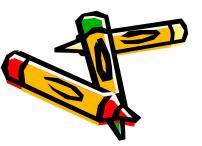
■ BMP's Delivered (Initial) ■ BMP's Delivered(Annual)



- Measure # of facilities in the program
- Completed 81% of scheduled BMPs

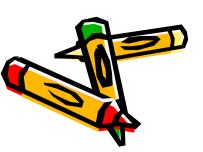
3 - Effectiveness

- Measure of overall impact of program
 - Trend of IAQ Parameter data
 - Trend of Customer Satisfaction data
 - Trend of Maintenance effort
 - Integrated with new work order system
 - To begin shortly
 - Trend of Energy Usage data
 - · More difficult, may get lost in 'noise'
 - Requires more detailed development



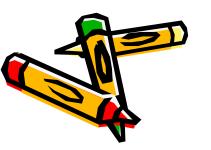
3 - Effectiveness

- Preliminary data shows
 - Limited success in IAQ parameters
 - Measures greatly influenced by staff activities
 - Measurable increases in air flow
 - Goals met for customer satisfaction
- Performance Measure in early stages, indices continue to be developed and benchmarks set and evaluated



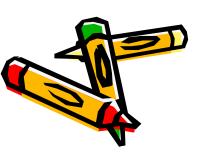
4 - Customer Satisfaction 'The Human Side'

- Perception of the indoor environment equally important as actual conditions
- Obtained from pre/post questionnaires
 - Perceived ventilation
 - % ill/uncomfortable
 - Team Satisfaction
- 'TRACKER' Data



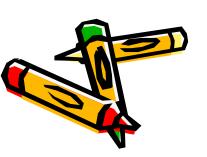
4 - Customer Satisfaction

- Measure of perception of indoor environment and reported concerns
 - Efforts to address building issues and communication with staff have shown 91% of satisfaction goals being met on initial visit
 - Success level up from 88% in March 2001
 - Same high level of satisfaction from teaching staff continues during annual revisit



Next Steps

- Complete facility assessments and building maintenance plans in additional schools
- Implement TfS at individual school level
- Continue to measure performance and implement best practices in school design, operation, training, and maintenance
- Improve and modify program through trend analysis of performance measures



Indoor Air Quality Steering Committee

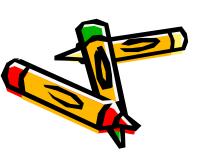
- Next step of Process Action Team
- Oversee implementation of Process Action Team recommendations
- Provide review of IAQ program
- Review of emerging technologies
- Forum for discussion of IAQ issues



Committee Members

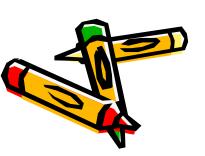
- Montgomery County Health Officer - Chair
- Facilities
 Administration
- Environmental Safety Coordinators
- School Maintenance
- School Plant Operations
- School Construction

- Energy Management
- Principal
- Union Members
- PTA Representative
- Safety Officer
- Community
 Representatives
- MC-DEP Representative
- Guests



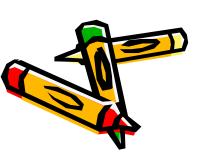
Results of Committee

- I AQ Program developed as Team
- Building of new positive relationships
- Air of trust and mutual respect
- Working together towards I AQ solutions!
- Support for continued budgetary commitment!



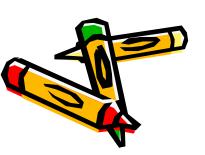
Special Projects

- IAQ in New Construction
 - Policies and procedures for isolating construction activities from occupied areas
- Health, Efficiency, and Productivity in Schools – Woods Research Institute
 - Pilot study to correlate improvements in the indoor environment with improvements in student performance



Case Study: Responding to Odors

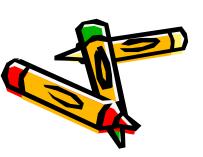
- Flooding from rain
- Other area of concern revealed
- Unknown odors
 - Reported health effects
 - Concerned community
- Systematic evaluation by IAQ/PM Team





Major Findings

- Roofing and site drainage issues
- Minor ventilation issues
- Weep holes closed
- Open expansion joints
- Minor mold growth behind cabinets
- Non-specific health complaints

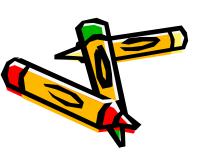


Response

- Building deficiencies addressed through PM program and the BMP
- Occupational Health Physician review
- Bio-aerosol assessments
- Sub-slab ventilation
- Community involvement in response
- Seasonal monitoring
- COMMUNICATION

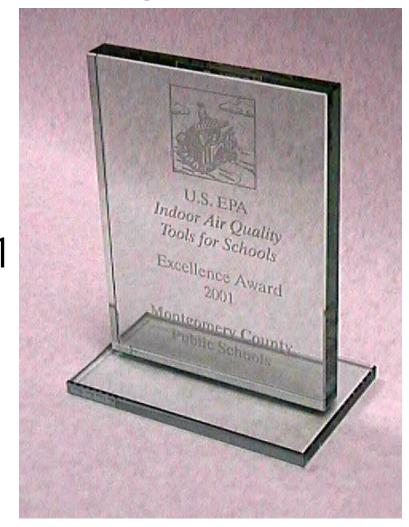
Final Outcome

- Remediation and control of odors
- Findings did not correlate health concerns with building conditions
- Community concerns addressed
- Long-term monitoring demonstrated long-term success
- COMMUNICATION!



In recognition of the MCPS IAQ Program:

 U.S. EPA Tools for Schools Award for Excellence 2001





IAQ Success Summary

- All are instrumental in success
- Prevention/cooperation is the key
- Formulate and follow a process to address concerns – Tools for Schools
- Formulate and implement prevention program – Tools for Schools
- COMMUNICATE!

